2nd PLC Based Control Systems WORKSHOP

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The 17th Biennial International Conference on Accelerator and Large Experimental Physics Control Systems

hosted by BROOKHAVEN NATIONAL LABORATORY

October 5-11, 2019 | New York, NY, USA

Goals

- To create a **COLLABORATIVE space** where attendees will exchange:
  - best practices
  - methods and tools employed
  - return of experience

  when engineering PLC based control systems.

- Identifying **expertise** among institutes which can foster **collaborations**

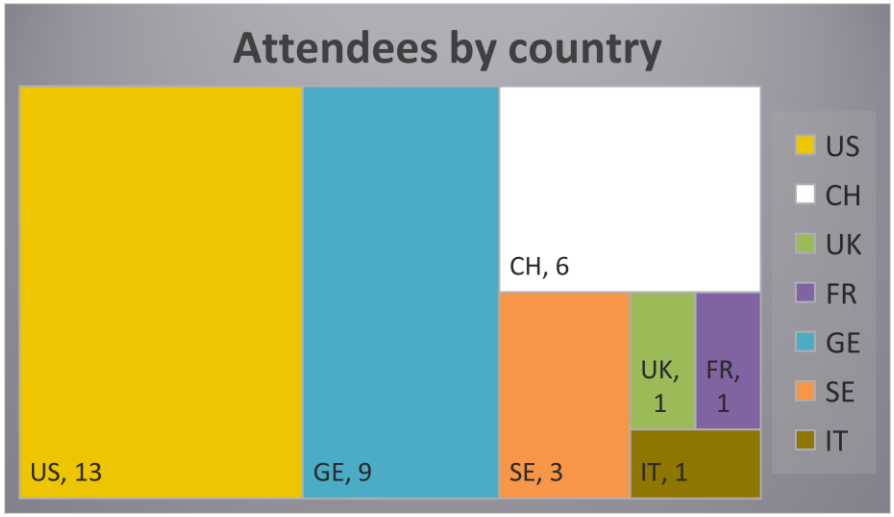
Feedback of the 1st Edition in Barcelona

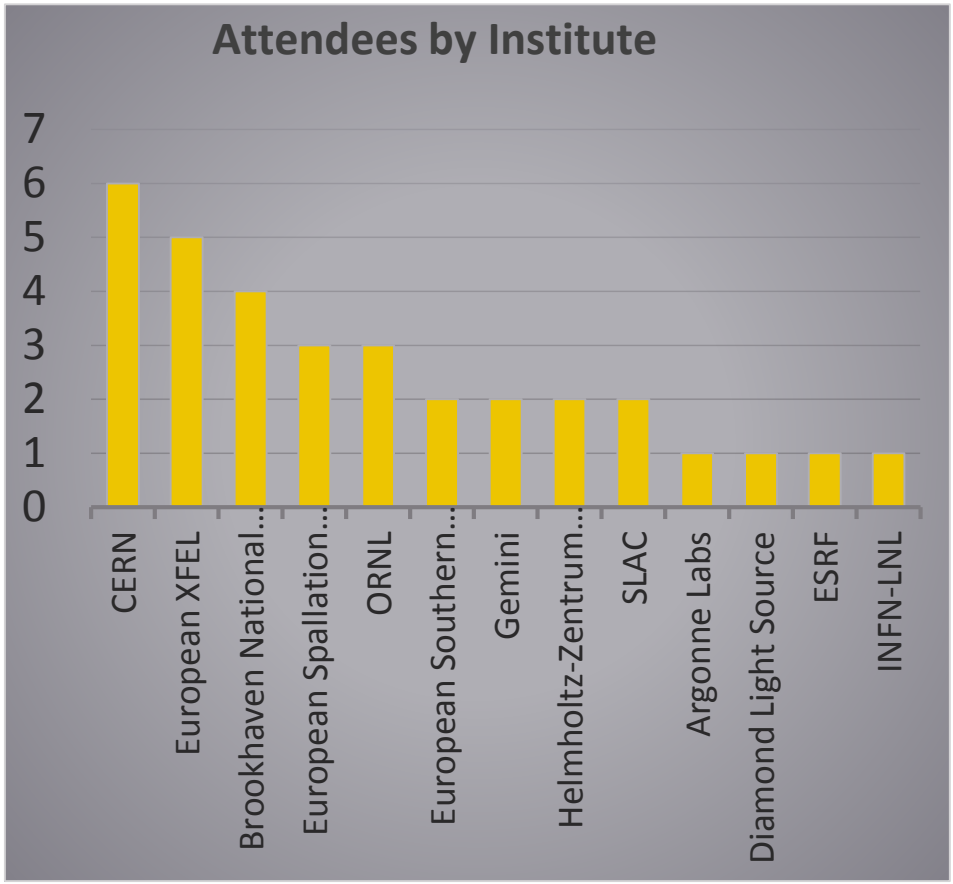
- Number of participants: 45
- **Identified expertise** among institutes
- Technical:
  - Specifications are not really unified
  - Frameworks seem to be a good move to boost efficiency
  - In house diverse **testing** (large room for improvement)
  - A move to a higher level programming languages (e.g. C++, Python)

Attendees

- 34 attendees

  (4 from the organization)





Main workshop topic

- Engineering Lifecycle of a PLC based application

Challenges

- PLC based applications life spans for **more than 15 years** in most of the cases. **Development and maintenance** of those applications is a complex task, as usually the applications do not follow any structure but the automation engineer own implementation. Is **standardization** a real need? Do the **control frameworks** give any help on this?

- **Testing** industrial applications is a time consuming task and usually an imperfect exercise. Compromises must be found to the test coverage (e.g. difficult offline tests). Formal verification is emerging as a complementary approach. What is the **best method to test an application**?

- Deploying applications must be tracked and the **software components deployed** must be easily **traceable**. In case of an issue in a delivered component in a project, a efficient identification of the affected PLCs should be straight forward. Are you in measure to identify this effectively?

- **Handling cents of applications** becomes a difficult task. Online **modifications** are required along the life of control systems and the management of such changes must be addressed. How engineers handle the **follow up of changes** with respect to initial specifications? How a standby service could know the right application to download to a PLC without the expert assistance?

Agenda

Timetable

Sat 05/10

Print | PDF | Full screen | Detailed view | Filter

09:00

Introduction
New York (USA) 09:00 - 09:10

Technology trends
Dr Enrique Blanco Vinuela
New York (USA) 09:10 - 10:10

10:00

Coffee break
New York (USA) 10:10 - 10:40

Presentation of Institutes
Dr Enrique Blanco Vinuela
New York (USA) 10:40 - 11:30

11:00

Specifications
Brad Schofield
New York (USA) 11:30 - 12:05

12:00

Project development
Dr Enrique Blanco Vinuela
New York (USA) 12:05 - 12:45

14:00

Testing & verification
Jeronimo Ortola Vidal
New York (USA) 14:00 - 15:00

15:00

Application management: (1)
New York (USA) 15:00 - 15:30

Coffee break
New York (USA) 15:30 - 16:00

16:00

Application management: (2)
New York (USA) 16:00 - 16:30

Closing session
New York (USA) 16:30 - 17:00

17:00

Agenda

- Technology trends

Cognitive Automation Engineering
Dr Gustavo Quiros Araya

Application of knowledge representation and artificial intelligence to automation engineering…

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Tracks & contributions

Specifications

- CEM: Cause Effect Matrix specifications (CERN)
- Process Control Specs (CERN)

Development

- State machine driven applications for instruments (ESO)
- PLC factory (ESS)

Testing

- Continuous Integration for PLC-based Control Systems (CERN)
- Device Simulation: Improving testing coverage of PLC code (ESO)
- Demo of the PLCVerif: A formal verification tool (CERN)

Management

- Application Management Tool (DIAMOND)
- Application Management (ORNL)

Support

Workshop webpage: https://indico.cern.ch/event/811867/

- Scientific program
- Contributions
- Agenda